REMARKS

The Official Action dated December 30, 2003 has been carefully considered. Accordingly, the changes presented herewith, taken with the following remarks, are believed sufficient to place the present application in condition for allowance. Reconsideration is respectfully requested.

In the present amendment, the specification has been amended to further clarify support for the limitations of claim 15 and 16 regarding communications protocol. Since these changes do not involve any introduction of new matter, entry is believed to be in order and is respectfully requested.

In the present amendment, Claims 1-3, 5-6, 11-17, 19 and 20 have been amended to correct minor informalities and overcome the Examiner's claim rejections relation to 35 U.S.C. §§ 101 and 112 as further discussed below. Since these changes do not involve any introduction of new matter, entry is believed to be in order and is respectfully requested.

In the Official Action, the Examiner objected to claims 1-2, 5-6, 13-15 and 17 for minor informalities. The Examiner's suggested claim amendments have been utilized. As such, the Examiner's objection has been overcome. Reconsideration is respectfully requested.

Claims 19 and 20 were rejected under 35 U.S.C. § 101 as being directed to non-statutory matter by embracing or overlapping two different statutory classes of invention. The claims have been amended to be directed to only one statutory class of invention. As such, the Examiner's rejection has been overcome. Reconsideration is respectfully requested.

Claim 16 was rejected under 35 U.S.C. § 112, first paragraph as containing subject matter which was not adequately described in the specification to convey possession of the claimed invention. The Examiner asserted that the communications protocol of hypertext transfer protocol was not disclosed in the specification. By the present amendment, the

specification has been amended to provide support for claim 16. As such, the Examiner's rejection has been overcome. Reconsideration is respectfully requested.

In the Official Action, claims 3, 11-12 and 16 were rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claim 3 has been amended as suggested by the Examiner to add a Markush group to distinctly set forth the claim. The claim limitations "significant" of claim 11 and "substantial" of claim 12 have been eliminated. Claim 16 has been amended to distinctly claim that the communications protocol is a hypertext transfer protocol. As such, the Examiner's rejections have been overcome, reconsideration is respectfully requested.

In the Official Action, claims 19 and 20 were rejected under 35 U.S.C. § 112 as claiming both an apparatus and a method step of using the apparatus. Claims 19 and 20 have been amended to overcome this rejection. Reconsideration is respectfully requested.

In the Official Action, the Examiner objected to the informal drawings. Formal drawings are being filed with this Amendment under separate cover. Reconsideration is respectfully requested.

In the Official Action, the Examiner rejected claims 1-5, 7, 10, 13-14, 17 and 19-20 under 35 U.S.C. § 102(b) as being anticipated by Satake et al. (Japanese Patent Publication 08-006644). The Examiner asserted that Satake et al. teach a method of controlling tuning a feedforward compensation parameter in a motion control system comprising a) determining an initial value of the feedforward compensation parameter; b) commanding an initial movement of an actuator according to a test motion routine, wherein the initial value of the parameter is used in the control of the actuator; c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine,

wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements.

However, as will be set forth in detail below, it is submitted that the methods and systems for tuning a feedforward compensation parameter in a motion control system set forth by claims 1-5, 7, 10, 13-14, 17 and 19-20 are not anticipated by Satake et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

As defined by claim 1, the present invention is directed to a method for tuning a feedforward compensation parameter in a motion control system, the method comprising:

a) determining an initial value of the feedforward compensation parameter;

b) commanding an initial movement of an actuator according to a test motion routine, wherein the initial value of the parameter is used in the control of the actuator;

c) determining error associated with the initial movement;

d) determining a potential value of the feedforward compensation parameter;

e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator;

f) determining error associated with the movement commanded in act e);

g) comparing the errors associated with the movements;

h) based on the act of comparing the errors, selecting one of the values as a current best value; and

i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements.

As defined by claim 13, the present invention is directed a method for tuning a compensation parameter in a motion control system having an actuator, wherein the motion control system utilizes a position command and a feedforward command to control motion of the actuator, and the compensation parameter compensates for a time-shifted relationship between the position command and the feedforward command, the method comprising:

a) determining an initial value of the compensation parameter;

b) commanding an initial movement of the actuator according to a test motion routine, wherein the initial value of the parameter is used in the control of the actuator;

c) determining error associated with the initial movement;

d) determining a potential value of the parameter;

e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator;

f) determining error associated with the movement commanded in act e);

g) comparing the errors associated with the movements;

h) based on the act of comparing the errors, selecting one of the values as a current best value; and

i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements.

Satake et al. is directed to a numerical controller which stabilizes the behavior of a controlled system by adding a correction torque value calculated in a machining cycle as a feedforward control value to a torque command value in the next machining cycle.

To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F3d 1376, 1383, 58 U.S.P.Q.2d 1286, 1291 (Fed. Cir. 2001); *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Further, the reference must describe the Applicant's claimed invention sufficiently to place a person of ordinary skill in the field of the invention in possession of it. *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986), *cert denied*, 482 U.S. 909 (1987); *In re Coker*, 463 F.2d 1344, 1348, 175 U.S.P.Q. 26, 29 (CCPA 1972).

Applicant finds no teaching or disclosure in Satake et al. of a method for tuning a feedforward compensation parameter in a motion control system comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements.

As defined by claim 14, the present invention is directed to a motion control system comprising:

a) a position command generator adapted to produce position commands;

b) a feedforward command generator adapted to produce feedforward commands based upon feedforward compensation parameters, wherein one of the feedforward

compensation parameters comprises a time-shift compensation parameter that compensates for a time-shifted relationship between the position command and the feedforward command;

d) a controller adapted to communicate with an actuator, the position command generator, and the feedforward command generator, and adapted to control the motion of the actuator based upon the position commands and the feedforward commands; and

e) a feedforward tuning unit adapted to:

i) determine an initial value of the time-shift compensation parameter;

ii) cause the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement;

iii) determine error associated with the initial movement;

iv) determine a potential value of the time-shift compensation parameter;

v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement;

vi) determine error associated with the movement wherein the potential value was used in the control of the actuator;

vii) compare the errors associated with the movements;

viii) select one of the values as a current best value based on the comparison; and

ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements.

Applicant finds no teaching or disclosure in Satake et al. of a motion control system comprising, *inter alia*, a feedforward tuning unit adapted to: i) determine an initial value of the time-shift compensation parameter; ii) cause the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement; iii) determine error associated with the initial movement; iv) determine a potential value of the time-shift compensation parameter; v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement; vi) determine error associated with the movement wherein the potential value was used in the control of the actuator; vii) compare the errors associated with the movements; viii) select one of the values as a current best value based on the comparison; and ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements.

Among other reasons, as every element and limitation of claims 1-5, 7, 10, 13-14, 17 and 19-20, as arranged therein, cannot be found in Satake et al., Satake et al. do not anticipate the presently claimed invention. Whereby, the rejection has been overcome and reconsideration is respectfully requested.

In the Official Action, claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of McCracken et al. (US Patent No. 5,029,143). The Examiner conceded that Satake et al. do not disclose that the test motion is associated with a swept sine chirp waveform. The Examiner asserted that McCracken et al. teach a method of simulating real-life acoustics motion by using a sine wave with chirp characteristics which accurately simulates real life condition. The Examiner asserted that it would have been

obvious to a person of ordinary skill in the art to modify Satake et al., in view of McCracken et al., by utilizing a test motion associated with a swept sine chirp waveform.

However, as will be set forth in detail below, it is submitted that the method defined by claim 6 is non-obvious and patentably distinguishable from Satake et al. in view of McCracken et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

To establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981; 180 U.S.P.Q. 580 (CCPA 1974). Moreover, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd.*, 34 U.S.P.Q.2d, 1565 (Fed. Cir. 1995); *In re Payne*, 203 U.S.P.Q. 245 (CCPA 1979). Satake et al. in view of McCracken et al. fail to satisfy these requirements.

The teachings of Satake et al. are discussed above. The deficiencies of Satake et al. are not overcome with the combination of McCracken et al. Moreover, McCracken et al. alone or in combination with Satake et al., fail to teach or suggest a method for tuning a feedforward compensation parameter in a motion control system, the method comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act

of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements.

Moreover, when a rejection depends on the combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. *In re Rouffet*, 149 F.3d 1350, 1355, 47 U.S.P.Q.2d 1453, 1456 (Fed. Cir. 1998). The question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness of making the combination. *In re Beattie*, 974 F.2d 1309, 1311-1312, 24 U.S.P.Q.2d 1040, 1042 (Fed. Cir. 1992). Applicant finds no teaching, suggestion or motivation for the combination of Satake et al. and McCracken et al. Satake et al. disclose a numerical controller for stabilizing and improving the machining precision of a motion control system, whereas McCracken et al. disclose a shaft rub simulator for acoustical signatures of a marine propeller shaft resonating through water for electroacoustical analysis. As such, Applicant finds no teaching or suggestion or motivation for the combination for Satake et al. and McCracken et al. The Examiner has not provided any motivation or suggestion of the combination as well. In view of the failure of Satake et al., alone or in combination with McCracken et al. to teach or suggest a method for tuning a feedforward compensation parameter in a motion control system, the method comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors

associated with at least two of the movements, Satake et al. in view of McCracken et al. do not render the presently claimed method obvious.

It is therefore submitted that the presently claimed method is nonobvious over and patentably distinguishable from Satake et al. in view of McCracken et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of Hansen et al. (US Patent No. 5,587,896). The Examiner conceded that Satake et al. do not disclose the act of comparing the errors comprises comparing a root mean squared value of each of the errors. The Examiner asserted that Hansen et al. teach a method for determining the noise band of a self-tuning controller by calculating the root mean square value of the measured noise. The Examiner asserted that it would have been obvious to a person of ordinary skill in the art to modify Satake et al., in view of Hansen et al., by utilizing a root mean squared value of each of the errors when comparing the error.

However, as will be set forth in detail below, it is submitted that the method defined by claim 8 is non-obvious and patentably distinguishable from Satake et al. in view of Hansen et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Claim 8 depends from claim 1. The deficiencies of Satake et al. with respect to claim 1 are discussed above. That is, Satake et al. fail to disclose a method for tuning a feedforward compensation parameter in a motion control system comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is

used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements. These deficiencies are not resolved by Hansen et al. Moreover, as defined by claim 8, the present invention is directed to a method for tuning a feedforward compensation parameter in a motion control system, wherein the act of comparing the errors comprises comparing an average root means squared value of each of the errors.

Hansen et al. disclose an apparatus and method for automatically adjusting the control parameters of a self-tuning controlled used to regulate a process having a measure process variable signal. An error signal is generated using the measured process variable signal which represents the closed-loop response of the process.

To establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka, supra.* Moreover, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd., supra*; *In re Payne, supra.* Satake et al. in view of Hansen et al. fail to satisfy these requirements.

In view of the failure of Satake et al. and Hansen et al., alone or in combination to teach, disclose or suggest a method for tuning a feedforward compensation parameter in a motion control system, comprising *inter alia*, the act of: c) determining error associated with the initial movement;; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine,

wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements., the combination of Satake et al. in view of Hansen et al. do not support a rejection under 35 U.S.C. §103.

It is therefore submitted that the presently claimed method is nonobvious over and patentably distinguishable from Satake et al. in view of Hansen et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of Bieg et al. (US Patent No. 6,519,860). The Examiner conceded that Satake et al. do not disclose the act of determining a potential value for the feedforward compensation parameter comprises using a technique based on a minimization algorithm to determine the potential value. The Examiner asserted that Bieg et al. teach a method for determining the kinematic parameters during calibration of an articulated coordinate measuring machine by using minimization algorithm, which accurately generates the best-fit parameters. The Examiner asserted that it would have been obvious to a person of ordinary skill in the art to modify Satake et al., in view of Bieg et al., by utilizing a technique based on a minimization algorithm to determine the potential value when determining a potential value for the feedforward compensation parameter.

However, as will be set forth in detail below, it is submitted that the method defined by claim 9 is non-obvious and patentably distinguishable from Satake et al. in view of Bieg et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Claim 9 depends from claim 1. The deficiencies of Satake et al. with respect to claim 1 are discussed above. That is, Satake et al. fail to disclose a method for tuning a feedforward compensation parameter in a motion control system comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements. These deficiencies are not resolved by Bieg et al. Moreover, as defined by claim 9, the present invention is directed to a method for tuning a feedforward compensation parameter in a motion control system, wherein the act of determining a potential value for the feedforward compensation parameter comprises using a technique based on a minimization algorithm to determine the potential value.

Bieg et al. disclose a system and method for evaluating the spatial positional performance of a machine having a movable member. The system and method compares the true position of the movable machine member, as measured by the true position of the probe tip, with the desired position of the movable machine member.

To establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka, supra.* Moreover, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession

of the public. *Glaxo Inc. v. Novopharm Ltd.*, *supra*; *In re Payne*, *supra*. Satake et al. in view of Hansen et al. fail to satisfy these requirements.

In view of the failure of Satake et al. and Bieg et al., alone or in combination to teach, disclose or suggest a method for tuning a feedforward compensation parameter in a motion control system, comprising *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements, the combination of Satake et al. in view of Bieg et al. do not support a rejection under 35 U.S.C. §103.

It is therefore submitted that the presently claimed method is nonobvious over and patentably distinguishable from Satake et al. in view of Bieg et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of Marshall et al. (US Patent No. 5,587,896). The Examiner conceded that Satake et al. do not disclose identifying the second best value and determining whether there is a significant percentage change between the second best value and the current value. The Examiner asserted that Marshall et al. teach a method for identifying the second best value and determining whether there is a significant percentage change between the second best value and the current best value. The Examiner asserted that

it would have been obvious to a person of ordinary skill in the art to modify Satake et al., in view of Marshall et al., by identifying the second best value and determining whether there is a significant percentage change between the second best value and the current best value.

However, as will be set forth in detail below, it is submitted that the method defined by claims 11 and 12 are non-obvious and patentably distinguishable from Satake et al. in view of Marshall et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Claims 11 and 12 depend from claim 1. The deficiencies of Satake et al. with respect to claim 1 are discussed above. That is, Satake et al. fail to disclose a method for tuning a feedforward compensation parameter in a motion control system comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements. These deficiencies are not resolved by Marshall et al. Moreover, as defined by claim 11, the present invention is directed to a method for tuning a feedforward compensation parameter in a motion control system, wherein the act of determining whether the current best value is the optimum value comprises: identifying which of the values is a second best value; and determining whether there is a percentage change between the second best value and the current best value.

Marshall et al. disclose a method and apparatus for recognizing an unknown character, pattern, or indicia as being a particular one of a group of known reference characters, patterns, indicia or the like. The system converts scanned data and uses it to identify the character.

When a rejection depends on the combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. *In re Rouffet, supra.* The question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness of making the combination. *In re Beattie, supra.* Applicant finds no teaching, suggestion or motivation for the combination of Satake et al. and Marshall et al. Satake et al. discloses a numerical controller for stabilizing and improving the machining precision of a motion control system, whereas Marshall et al. disclose a method and apparatus for analyzing, recognizing and categorizing waveforms, patterns, characters, indicia, or signatures through the use of a Fourier Transform operation. There is no suggestion of the invention of Marshall et al. being used in a motion control system. The Examiner has not provided any motivation or suggestion of the combination as well. As such, Applicant finds no teaching or suggestion or motivation for the combination for Satake et al. and Marshall et al.

Moreover, to establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka, supra.* Moreover, in order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd., supra*; *In re Payne, supra.* Satake et al. in view of Marshall et al. fail to satisfy these requirements.

In view of the failure of Satake et al. and Marshall et al., alone or in combination to teach, disclose or suggest a method for tuning a feedforward compensation parameter in a

motion control system, comprising, *inter alia*, the act of: c) determining error associated with the initial movement; d) determining a potential value of the feedforward compensation parameter; e) commanding a movement of the actuator according to the test motion routine, wherein the potential value of the parameter is used in the control of the actuator; f) determining error associated with the movement commanded in act e); g) comparing the errors associated with the movements; h) based on the act of comparing the errors, selecting one of the values as a current best value; and i) repeating acts d) - h) until the current best value is an optimum value, wherein the act of comparing the errors associated with the movements comprises comparing the errors associated with at least two of the movements, the combination of Satake et al. in view of Marshall et al. do not support a rejection under 35 U.S.C. §103.

It is therefore submitted that the presently claimed methods are nonobvious over and patentably distinguishable from Satake et al. in view of Marshall et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, claims 15 and 16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of Wallace et al. (US Patent No. 5,587,896). The Examiner conceded that Satake et al. do not disclose that the feedforward tuning unit is adapted to communicate with at least one of the actuator, the controller, the position command generator, and the feedforward command generator via a data communication network and in compliance with a communications protocol. The Examiner asserted that Wallace et al. teach using a communications protocol to communicate over a data communications network via hypertext transfer protocol. The Examiner asserted that it would have been obvious to a person of ordinary skill in the art to modify Satake et al., in view of Wallace et al., by adapting the feedforward tuning unit to communicate with at least one of the actuator, the controller, the position command generator, and the feedforward

command generator via a data communication network and in compliance with a communications protocol such as hypertext transfer protocol.

However, as will be set forth in detail below, it is submitted that the motion control systems defined by claims 15 and 16 are non-obvious and patentably distinguishable from Satake et al. in view of Wallace et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Claims 15 and 16 depend from claim 14. The deficiencies of Satake et al. with respect to claim 14 are discussed above. That is, Satake et al. fail to disclose a motion control system comprising, *inter alia*, a feedforward tuning unit adapted to: i) determine an initial value of the time-shift compensation parameter; ii) cause the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement; iii) determine error associated with the initial movement; iv) determine a potential value of the time-shift compensation parameter; v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement; vi) determine error associated with the movement wherein the potential value was used in the control of the actuator; vii) compare the errors associated with the movements; viii) select one of the values as a current best value based on the comparison; and ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements. These deficiencies are not resolved by Wallace et al. Moreover, as defined by claim 15, the present invention is directed to a motion control system, wherein the feedforward tuning unit is adapted to communicate with at least one of the actuator, the

controller, the position command generator, and the feedforward command generator via a data communication network and in compliance with a communications protocol.

Wallace et al. disclose a system and method for the remote dispensing of packaged and non-packaged medical products using networked communications systems. The system utilizes a network to provide for the secure delivery of confidential patient information and sending dispense instructions to a remote dispensing station.

When a rejection depends on the combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. *In re Rouffet, supra.* The question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness of making the combination. *In re Beattie, supra.* Applicant finds no teaching, suggestion or motivation for the combination of Satake et al. and Wallace et al. Satake et al. discloses a numerical controller for stabilizing and improving the machining precision of a motion control system, whereas Wallace et al. disclose a method and system for drug dispensing. There is no suggestion of the invention of Wallace et al. being used in a motion control system. Furthermore, the Examiner has not provided any motivation or suggestion of the combination. As such, Applicant finds no teaching or suggestion or motivation for the combination for Satake et al. and Wallace et al.

Moreover, to establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka, supra.* In order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd., supra*; *In re Payne, supra.* Satake et al. in view of Wallace et al. fail to satisfy these requirements.

In view of the failure of Satake et al. and Wallace et al., alone or in combination to teach, disclose or suggest a motion control system comprising, *inter alia*, a feedforward

tuning unit adapted to: i) determine an initial value of the time-shift compensation parameter; ii) cause the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement; iii) determine error associated with the initial movement; iv) determine a potential value of the time-shift compensation parameter; v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement; vi) determine error associated with the movement wherein the potential value was used in the control of the actuator; vii) compare the errors associated with the movements; viii) select one of the values as a current best value based on the comparison; and ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements, the combination of Satake et al. in view of Wallace et al. do not support a rejection under 35 U.S.C. §103.

It is therefore submitted that the presently claimed method is nonobvious over and patentably distinguishable from Satake et al. in view of Wallace et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

In the Official Action, claim 18 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Satake et al. in view of Lee et al. (Principles and methods of testing finite state machine - a survey, August 1996). The Examiner conceded that Satake et al. do not disclose that the feedforward tuning unit comprises a finite state machine. The Examiner asserted that Lee et al. teach using a finite state machine to model electronic systems, in order to ensure correct functioning of systems and discover aspects of their behavior. The Examiner asserted that it would have been obvious to a person of ordinary skill in the art to

modify Satake et al., in view of Lee et al., by incorporating a finite state machine in the feedforward tuning unit.

However, as will be set forth in detail below, it is submitted that the motion control system defined by claim 18 is non-obvious and patentably distinguishable from Satake et al. in view of Lee et al. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

Claim 18 depends from claim 14. The deficiencies of Satake et al. with respect to claim 14 are discussed above. That is, Satake et al. fail to disclose a motion control system comprising, *inter alia*, a feedforward tuning unit adapted to: i) determine an initial value of the time-shift compensation parameter; ii) cause the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement; iii) determine error associated with the initial movement; iv) determine a potential value of the time-shift compensation parameter; v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement; vi) determine error associated with the movement wherein the potential value was used in the control of the actuator; vii) compare the errors associated with the movements; viii) select one of the values as a current best value based on the comparison; and ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements. These deficiencies are not resolved by Lee et al. Moreover, as defined by claim 18, the present invention is directed to a motion control system, wherein the feedforward tuning unit comprises a finite state machine.

Lee et al. disclose a survey of the principles and methods of testing finite state machines. Lee et al. disclose that finite state machines have been widely used to model systems in diverse areas, including sequential circuits, some types of programs and communications protocols.

When a rejection depends on the combination of prior art references, there must be some teaching, suggestion, or motivation to combine the references. *In re Rouffet, supra.* The question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness of making the combination. *In re Beattie, supra.* Applicant finds no teaching, suggestion or motivation for the combination of Satake et al. and Lee et al. Satake et al. discloses a numerical controller for stabilizing and improving the machining precision of a motion control system, whereas Lee et al. disclose the fundamental problems in testing finite state machines and techniques for solving these problems. There is no suggestion of the finite state machines in Lee et al.to be combined with a motion control system of Satake et al. Furthermore, the Examiner has not provided any motivation or suggestion of the combination. As such, Applicants find no teaching or suggestion or motivation for the combination for Satake et al. and Lee et al.

Moreover, to establish prima facie obviousness of the claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka, supra.* In order for references to be relied upon to support a rejection under 35 U.S.C. § 103 they must provide an enabling disclosure, i.e., they must place the claimed invention in the possession of the public. *Glaxo Inc. v. Novopharm Ltd., supra*; *In re Payne, supra.* Satake et al. in view of Lee et al. fail to satisfy these requirements.

In view of the failure of Satake et al. and Lee et al., alone or in combination to teach, disclose or suggest a motion control system comprising, *inter alia*, a feedforward tuning unit adapted to: i) determine an initial value of the time-shift compensation parameter; ii) cause

the position command generator to produce position commands according to a test motion routine, wherein the initial value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes an initial movement; iii) determine error associated with the initial movement; iv) determine a potential value of the time-shift compensation parameter; v) cause the position command generator to produce position commands according to the test motion routine, wherein the potential value of the time-shift compensation parameter is used in the control of the actuator and the actuator undergoes movement; vi) determine error associated with the movement wherein the potential value was used in the control of the actuator; vii) compare the errors associated with the movements; viii) select one of the values as a current best value based on the comparison; and ix) repeat actions in iv) - viii) until the current best value is an optimum value, wherein the feedforward tuning unit compares the errors associated with at least two of the movements, the combination of Satake et al. in view of Lee et al. do not support a rejection under 35 U.S.C. §103.

It is therefore submitted that the presently claimed method is nonobvious over and patentably distinguishable from Satake et al. in view of Lee et al., whereby the rejection under 35 U.S.C. §103 has been overcome. Reconsideration is respectfully requested.

It is believed that the above represents a complete response to the Examiner's objections and rejections under 35 U.S.C. §§101, 102, 103 and 112 and places the present application in condition for allowance. Reconsideration and an early allowance are requested.

Respectfully submitted,

By _____

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